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FLUID FLOW DELIVER SYSTEM FROM STRONGROOM TO ARMoured VEHICLE
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The invention provides a delivery system for transferring goods, such as bank notes bundled into containers, from a first location such as a cash room, to a second location, such as an armoured vehicle. The system has a first delivery means (5) through which the goods can be transferred from the first location to an intermediate location, such as a docking station (10). A second delivery means (14) transfers the goods from the intermediate location (10) to the second location. The system includes means such as turbine (22) for drawing the goods from the first location to the intermediate location (10) via the first delivery means (5) and from the intermediate location (10) to the second location via the second delivery means (14).

Preferably, the means (22) for drawing the goods creates sufficient partial vacuum within the first and second delivery means (5, 14) to transfer the goods. It is also preferred that the second delivery means (14) is a flexible tube.

The invention also provides the docking station (10) for use in connection with the delivery system and a method of transferring goods from the first location to the second location.

ABSTRACT

The invention provides a delivery system for transferring goods, such as bank notes bundled into containers, from a first location such as a cash room, to a second location, such as an armoured vehicle. The system has a first delivery means (5) through which the goods can be transferred from the first location to an intermediate location, such as a docking station (10). A second delivery means (14) transfers the goods from the intermediate location (10) to the second location. The system includes means such as turbine (22) for drawing the goods from the first location to the intermediate location (10) via the first delivery means (5) and from the intermediate location (10) to the second location via the second delivery means (14).

Preferably, the means (22) for drawing the goods creates sufficient partial vacuum within the first and second delivery means (5, 14) to transfer the goods. It is also preferred that the second delivery means (14) is a flexible tube.

The invention also provides the docking station (10) for use in connection with the delivery system and a method of transferring goods from the first location to the second location.

AUSTRALIA
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PATENT REQUEST: STANDARD PATENT

I/we, being identified below as the applicant/s request the grant of a patent to the person identified below as the nominated person, for an invention described in the accompanying specification.

Full application details follow.

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(54) Invention title: **DELIVERY SYSTEM**
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NSL INVESTMENTS PTY LIMITED



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PATENT ATTORNEY

Date: 23 July 1998

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COMPLETE SPECIFICATION
FOR A STANDARD PATENT

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Invention Title: Delivery System

The following statement is a full description of this invention, including the best method of performing it known to me/us:

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This invention relates to a delivery system. In particular, this invention is concerned with a delivery system which is useful in situations where security is necessary, such as the delivery of cash or other valuables.

Generally, the description below will deal with the delivery of cash, especially
5 bank notes. It is to be understood, however, that the present invention is capable of wider application and is not limited to the delivery of these types of goods.

Currently, armoured vehicles and security guards are used to collect cash from retailers and other sources. It is necessary for an armed security guard (and more often two or more armed security guards) to travel from the armoured vehicle
10 parked outside the premises to the cash room within the premises and to carry out the cash from the cash room to the waiting armoured vehicle. There are several drawbacks to this process.

The first drawback is that the armoured guard or guards, when carrying the cash, are vulnerable to attack until they enter the armoured vehicle. From time to time,
15 security guards are killed or injured during this period of vulnerability. Quite understandably, security guards are anxious to reduce their exposure. A recent enquiry has recommended the provision of bullet-proof vests, a reduction in the amount of cash being carried on any trip and the provision of a back-up vehicle. Obviously, none of these suggestions will eliminate or substantially reduce risk to
20 the security guards. Moreover, the need to provide bullet-proof vests, a back-up armoured vehicle or to reduce the amount of cash carried, thereby increasing the number of trips necessary, all add to the cost of cash collection.

There are other drawbacks associated with the present process of cash collection. In many cases, the security guard or guards have no protected route
25 between the armoured vehicle and the cash room. With many retailers being located in shopping malls, it frequently occurs that security guards are obliged to carry cash through crowds of shoppers and other members of the public. Any attack on security guards in this environment endangers the safety of people around the security guards.

Another factor which adds to the expense of the present process of cash collection is the prevailing practice of providing several security guards for each collection trip. One security guard remains with the armoured vehicle while the other two security guards collect the cash and return it to the armoured vehicle.

- 5 It is an object of the present invention to provide an improved delivery system which is suitable for delivery of cash from the cash room or cash repository to the armoured vehicle without the need for the cash to be transported to the vehicle by any security guard. It is a further object of this invention to provide such an improved delivery system which does not expose shoppers or other persons to
10 danger. It is yet a further object of the present invention to provide such a delivery system, which, at least in some embodiments, can reduce the cost of cash collection and which is capable of being operated by two security guards, instead of using three as in the commonly used current system.

Accordingly, this invention provides a delivery system for transferring goods from
15 a first location to a second location, the system comprising a first delivery means for transferring the goods from the first location to an intermediate location, a second delivery means for transferring the goods from the intermediate location to the second location and means for drawing the goods from the first location to the intermediate location via the first delivery means and from the intermediate
20 location to the second location via the second delivery means.

Preferably, the goods to be transferred by the system of the invention comprise bank notes bundled into containers suitable for travelling through the first delivery means and the second delivery means. The description below will refer to "cash" as meaning bank notes, although it is appreciated that the invention is not limited
25 to application to the goods being cash.

Generally, the first location will be the cash room or other repository for cash. The second location will normally be an armoured vehicle or a specific part thereof, such as a vault or strong box forming part of or attached to the armoured vehicle.

The intermediate location is preferably a docking station located on an external

wall of the premises in which the first location is contained. However, the docking station need not be on an external wall, provided it is accessible to the second location, especially when it is an armoured vehicle. It is greatly preferred that the intermediate location is transparent to the first and second delivery means; in
6 other words, goods are transferred from the first location to the second location without pausing or stopping at the intermediate location.

This invention also provides a docking station suitable for use in connection with the delivery system of the invention, the docking station being located at the intermediate location and providing means for communication between the first
10 delivery means and the second delivery means.

The first and second delivery means preferably comprise conduits, or different parts of one continuous conduit, through which containers for the cash may be drawn. It is especially preferred that the first delivery means comprises a rigid tubing, such as that currently used in air tube systems to convey cash from cash
15 registers to an internal cash room or repository. This type of tube is commonly made of plastic but may of course be constructed of any other suitable material, including metal.

While the second delivery means may also comprise a rigid tube, it is greatly preferred that the second delivery means consists of a flexible reinforced tube,
20 especially a flexible reinforced plastic tube which is further reinforced by a metal wire wound helically around the tube, optionally incorporated in the tube wall.

The second delivery means may be permanently or detachably fixed or annexed to the first delivery means or to the intermediate location. For example, a quick release coupling may connect the second delivery means to the intermediate
25 location. Other forms of fixing may also be suitable. In one embodiment, the second delivery means is stored inside the first delivery means and may be partially pulled out for use; the part of the second delivery means remaining within the first delivery means can provide sufficient connection between the two means.

The means for drawing the cash in containers through the system is preferably a

vacuum pump or turbine, mounted in or under or attached to the armoured vehicle, and capable of creating sufficient partial vacuum within the first and second delivery means to draw the cash in containers through the system.

In a further aspect, this invention provides a method of transferring goods from a first location to a second location, the method comprising the steps of drawing the goods from a first location to an intermediate location via a first delivery means and drawing the goods from the intermediate location to a second location via second delivery means.

Since, in a preferred embodiment, the cash is to be drawn through the first and second delivery means by the creation of a partial vacuum, it is preferred that the containers for the cash are so designed so as to be capable of substantially filling a cross-section of the first and second delivery means, to facilitate drawing of the containers through the system.

It is possible to use, at least in connection with some embodiments of the second invention, the prior art cash containers employed in existing air tube systems. These are commonly rigid plastic cylinders, there being mounted one or more rings on the body of the cylinder to contact the internal wall of the air tube, thereby assisting passage of the container through the air tube when air is forced through the system.

However, as has been stated above, it is greatly preferred that the second delivery means is a flexible tube. The prior art air tube containers may not be quite so suitable for use in the case where the second delivery system is a flexible tube. If it is necessary to bend the flexible tube in certain ways, the prior air tube containers may have a tendency to become wedged within the flexible tube.

Consequently, it is far preferable to use a type of container such as a canvas bag or a parachute bag (also known as a flight bag). A parachute bag is a bag made of flexible, sometimes semi-transparent material. In one form, a parachute bag is square or rectangular in outline, being closed on three of its four sides. The fourth side includes a self-sealing flap. Once cash or other goods are placed within the

parachute bag, the flap can be folded over, thus sealing the bag. Because of the nature of the material from which the parachute bag is made and the type of adhesive on the flap, the parachute bag, once sealed, cannot be opened without destroying the bag. Thus, tampering with the bag is readily detected. Because the
5 bag is flexible, when a partial vacuum is applied to the first and second delivery means, the bag will tend to be orientated so that it substantially fills a cross-sectional area of the first or second delivery means, thereby enhancing the passage of the bag through the system when a partial vacuum is applied.

As an adjunct to the system of the present invention, it is an option to apply a
10 unique identifier to each filled bag. Such a unique identifier may be, for example, a bar code readable by a bar code reader, as explained further below. Ideally, each bar code is positioned across the sealed flap so that tampering will be evident.

Because the system of the invention is especially suitable for the delivery of cash,
15 the invention may include certain options which can enhance security of the delivery system. For example, the system of the invention preferably includes a safeguard against any attempt at unauthorised use of the system. In one form, the second delivery means is detachable from both the intermediate location and the second location, eg. the armoured vehicle. Using the example of the second
20 delivery means comprising a flexible, reinforced tube, it is convenient to incorporate in each end of the tube identifying indicia, each of which is readable by electronic intelligent means. One such electronic intelligent means is located at the intermediate location, where one end of the flexible hose is attachable. The other electronic intelligent means is located in the armoured vehicle, at the point
25 where the other end of the flexible hose is attachable. The system may be configured so that the means to draw the cash containers through the system cannot be activated unless both electronic intelligent means correctly read each of the identifying indicia at the relevant end of the flexible hose.

As a further safety precaution, the flexible hose may be alarmed to indicate any
30 breach. Conveniently, the wire reinforcement of the flexible hose may carry the

alarm means, so that any severing of the wire would cause the alarm to be activated.

It will be readily appreciated by one skilled in the art that if the flexible hose (or, indeed, any part of the first and second delivery means) were to be breached
5 during operation, the partial vacuum in the system would cease and the drawing of cash in containers through the system would stop. This minimises the likelihood of loss of cash from the system in the case of breach during operation. To further minimise loss in the case of a breach in the system, it is preferred that containers are fed into the system at the first location at intervals, for example at
10 intervals of five or ten seconds each.

As yet a further safety option, the system may require the input of a password, which can be changed from time to time as required, before it will operate.

Further precautions may be taken to prevent tampering with the second delivery means. Especially where the second delivery means is a flexible hose detachable
15 from the first delivery means or the intermediate location, it is preferred that a suitable security device is incorporated in the coupling between the flexible hose and the armoured vehicle at one end, and in the coupling between the flexible hose and the intermediate location at the other end. Many security devices will be suitable for this purpose, including mechanical as well as electronic devices, as
20 will be apparent to one skilled in the art. Examples of some security devices which may be suitable are: a keyed lock; a tag in the coupling in each end of the flexible hose, readable by electronic means in the corresponding coupling at the intermediate station and the armoured vehicle, respectively.

It is convenient if the flexible hose comprising the second delivery means in this
25 embodiment includes or has attached to it a power cable, to facilitate operation of the electric or electronic components of the system, including an intercom (refer description below, relating to the drawings).

As has been indicated already, it is preferred that, in the second location (the armoured vehicle in this example), there is a vault or strongbox into which the

cash is delivered by the system of the invention. It may be desirable that this vault or strongbox is sealed and may be opened only after the input of a required security code or in the presence of authorised personnel. In this embodiment, it is preferred that the vault or strongbox includes means for counting or logging
5 containers received into the vault or strongbox and displays the results in a visual display readable outside the vault or strongbox.

For example, the vault or strongbox may include a simple counter which registers the number of cash containers received. This can be used as a safety check to confirm that the number of containers inserted into the system at the cash room
10 (the first location) corresponds with the number of containers received at the second location (in the vault or strongbox).

In a more sophisticated version, where each container has a unique identifier, such as a bar code, the vault or strongbox may include a bar code reader which registers not only the number of containers received in the vault or strongbox, but
15 also records each bar code.

The invention will now be described with reference to a preferred embodiment thereof as illustrated in the accompanying drawings. It is to be understood that the embodiment illustrated is not intended to be limiting on the scope of the invention.

20 In the drawings:

Figure 1 is a schematic drawing showing a first part of one embodiment of the invention, namely, the first location, the first delivery means and the intermediate location; and

Figure 2 is a schematic view of the second part of the embodiment in Figure 1,
25 showing the second delivery means and the second location.

Referring first to Figure 1, the system has, situated in a cash room being the first location, a carrier station 2 in which is mounted an intercom 1. Carrier station 2 is mounted on bench 4 for stability. Alternately, it can be mounted on a wall of the

cash room.

The first delivery means comprises PVC tube 5, which has mounted near carrier station 2 a sensor 3, to sense containers or articles inserted in tube 5 from carrier station 2.

5 Tube 5 passes through or above wall 6 of the cash room, preferably at ceiling height, and continues to loading dock wall 8, where it enters docking station 10. Mounted in docking station 10 is a switch 9 for power and data. Docking station 10 has a hinged weatherproof enclosure 13 which is illustrated an open position.

Tube 5 is attached to flexible tube 14 at docking station 10. Flexible tube 14 is
10 normally stored in enclosure 13 when not in use.

Cable 17 is used for power, data and communication between carrier station 2 and armoured vehicle 16 (see Figure 2) and is connected to docking station 10. Attached to the end of cable 17 is a socket 30 which is connected to a
15 corresponding power connector 18 (as shown in Figure 2) when the system is to be used.

Referring now to Figure 2, flexible tube 14 runs from docking station 10 in wall 8 (refer Figure 1) to strongbox or receiver cabinet 11 in armoured vehicle 16. Cable 17 is connected via socket 30 to power connector 18 forming part of station 19 on vehicle 16. Flexible tube 14 is coupled to station 19 on vehicle 16, preferably by a
20 complementary quick release coupling 24 and connects with rigid PVC pipe 21 which serves to convey containers into receiver cabinet 11.

Mounted on tube 21 is sensor 15, which senses the arrival of containers from tube 21 into receiver cabinet 11.

Turbine 22 serves to create a partial vacuum in tubes 21, 14 and 5 when
25 connected to receiver cabinet 11 via air tube 23.

Cable 17 is connected via cable 28 to auxiliary control unit 26 which controls turbine 22 and via cable 29 provides a data and communication interface to and

from console 25 set up in the driver's cabin.

A sliding valve 27 is part of station 19 and is designed to be closed at all times except when the system is being used, to ensure the security of the area where station 19 is constructed in vehicle 16.

- 5 To operate this embodiment of the delivery system of the invention, only two security guards are required. One guard leaves the armoured vehicle, which is manoeuvred by the other guard so that the first guard can connect flexible tube 14 from station 10 to station 19 by using complementary coupling 24. Because tube 14 is flexible, precision of manoeuvring of vehicle 16 is not necessary.
- 10 The first guard also connects power cable 17 to connector 18. The first guard then moves to the cash room and informs the second guard (via intercom 1 or via a mobile phone) that the first guard is in place.

The second guard activates his console 25 by depressing a button or activating a switch which turns on turbine 22 via auxiliary control unit 26 and a partial vacuum
15 is created in the system. The action also opens sliding valve 27 which is attached to vehicle 16.

- The first guard feeds parachute bags containing cash into the system at carrier station 2, at intervals of approximately 5 to 10 seconds. As each container passes sensor 3, its passage is recorded. Each container is drawn along tube 5, through
20 station 10, along flexible pipe 14, through station 19, along pipe 21 and into cabinet 11. As each container passes sensor 15, its passage is recorded. When all desired containers have been fed through the system, the first guard sends a rigid container through the system to activate a printer (not shown) which records the number of parachute bags sent. Sliding valve 27 in vehicle 16 is closed off.
- 25 Turbine 22 is deactivated and console 25 indicates that all bags have arrived in cabinet 11.

Both stations 10 and 19 may be secured and concealed when not in use by a lockable, hinged door.

Intercom 1 may communicate with an intercom being part of console 25 in the driver's cabin.

After the delivery of the containers is completed, the first guard can leave the cash room, uncouple tube 14 and power/data lead 17 and lock stations 10 and
s 19. The delivery system process is then complete.

It will be readily appreciated that the system and method of the invention enables goods such as cash to be transported without exposing security guards and members of the public to many of the dangers they presently face. In addition, if there is any attempt to breach the system, it is likely that the loss of cash will be
10 minimal, since the system will stop as soon as the partial vacuum disappears. Further, the transport of cash can be carried out using only two security guards, although, if desired, a third security guard may be placed in close proximity to flexible tube 14 to deter attempts to breach tube 14.

The claims defining this invention are as follows:

1. A delivery system for transferring goods from a first location to a second location, the system comprising a first delivery means for transferring the goods from the first location to an intermediate location, a second delivery
5 means for transferring the goods from the intermediate location to the second location and means for drawing the goods from the first location to the intermediate location via the first delivery means and from the intermediate location to the second location via the second delivery means.
2. The delivery system of claim 1, wherein the means for drawing the goods
10 are adapted to create sufficient partial vacuum within the first and second delivery means to transfer the goods.
3. The delivery system of claim 2, wherein the means for drawing the goods comprise a vacuum pump or turbine mounted in or at the second location.
4. The delivery system of claim 2 or 3, wherein the goods to be transferred
15 comprise bank notes bundled into containers suitable for travelling through the first delivery means and the second delivery means.
5. The delivery system of claim 4, wherein the containers are capable of substantially filling a cross section of the first and second delivery means, to facilitate drawing of the containers through the system.
- 20 6. The delivery system of claim 4 or 5, wherein the containers are chosen from the group comprising canvas bags, parachute bags and flight bags.
7. The delivery system of any one of claims 1 to 6, wherein the first location is a cash room or other repository for cash.
8. The delivery system of any one of claims 1 to 7, wherein the second location
25 is an armoured vehicle.
9. The delivery system of any one of claims 1 to 7, wherein the second location

is a vault or strongbox forming part of or attached to an armoured vehicle.

10. The delivery system of any one of claims 1 to 9, wherein the intermediate location is a docking station located on a wall of premises in which the first location is contained.
- 5 11. The delivery system of claim 10, wherein the wall is an external wall of the premises.
12. The delivery system of any one of claims 1 to 11, wherein the means for drawing the goods enable the goods to be transferred from the first location to the second location without pausing or stopping at the intermediate location.
- 10 13. The delivery system of any one of claims 1 to 12, wherein the first and second delivery means comprise conduits, or different parts of one continuous conduit, through which the goods may be drawn.
14. The delivery system of any one of claims 1 to 13, wherein the first delivery means comprises a rigid tube.
- 15 15. The delivery system of any one of claims 1 to 14, wherein the first delivery means comprises an air tube system.
16. The delivery system of any one of claims 1 to 15, wherein the second delivery means comprises a flexible tube.
- 20 17. The delivery system of claim 16, wherein the flexible tube is reinforced by a metal wire wound helically around the tube.
18. The delivery system of any one of claims 1 to 17, wherein the second delivery means is permanently fixed or annexed to the first delivery means or to the intermediate location.
- 25 19. The delivery system of any one of claims 1 to 17, wherein the second delivery means is detachably affixed or annexed to the first delivery means

or to the intermediate location.

20. The delivery system of any one of claims 1 to 19, wherein the second delivery means is stored inside the first delivery means and adapted to be partially pulled out for use.
- 5 21. The delivery system of claim 20, wherein part of the second delivery means remains within the first delivery means after the second delivery means is partially pulled out for use and provides an adequate connection between the first and second delivery means.
- 10 22. The delivery system of any one of claims 1 to 21 wherein means are provided to isolate the second location from the first and second delivery means when goods are not being drawn through the delivery system.
23. The delivery system of claim 22, wherein the isolation means comprise a sliding valve inserted between the second delivery means and the second location.
- 15 24. A docking station suitable for use in connection with the delivery system of claim 1, the docking station being located at the intermediate location and providing means for communication between the first delivery means and the second delivery means.
- 20 25. The docking station of claim 24, wherein the communication means comprises a detachable connection between the first delivery means and the second delivery means.
26. The docking station of claim 24, wherein the communication means comprises a permanent connection between the first delivery means and the second delivery means.
- 25 27. The docking station of any one of claims 24 to 26, wherein the second delivery means is stored within the docking station.

28. In a delivery system for transferring goods from a first location to a second location, in which the system has first delivery means through which the goods are to be transferred, the improvement comprising the provision of a second delivery means for transferring the goods from an intermediate
5 location to the second location and means for drawing the goods from the first location to the intermediate location via the first delivery means and from the intermediate location to the second location via the second delivery means.
29. The improvement of claim 28, wherein the means for drawing the goods are
10 adapted to create sufficient partial vacuum within the first and second delivery means to transfer the goods.
30. The improvement of claim 29, wherein the means for drawing the goods comprise a vacuum pump or turbine mounted in or at the second location.
31. The improvement of claim 29 or 30, wherein the goods to be transferred
15 comprise bank notes bundled into containers suitable for travelling through the first delivery means and the second delivery means.
32. The improvement of claim 31, wherein the containers are capable of substantially filling a cross section of the first and second delivery means, to facilitate drawing of the containers through the system.
- 20 33. The improvement of claim 31 or 32, wherein the containers are chosen from the group comprising canvas bags, parachute bags and flight bags.
34. The improvement of any one of claims 28 to 33, wherein the first location is a cash room or other repository for cash.
35. The improvement of any one of claims 28 to 34, wherein the second location
25 is an armoured vehicle.
36. The improvement of any one of claims 28 to 34, wherein the second location is a vault or strongbox forming part of or attached to the armoured vehicle.

37. The improvement of any one of claims 28 to 36, wherein the intermediate location is a docking station located on a wall of premises in which the first location is contained.
38. The improvement of claim 37, wherein the wall is an external wall of the premises.
39. The improvement of any one of claims 28 to 38, wherein the means for drawing the goods enable the goods to be transferred from the first location to the second location without pausing or stopping at the intermediate location.
40. The improvement of any one of claims 28 to 39, wherein the first and second delivery means comprise conduits, or different parts of one continuous conduit, through which the goods may be drawn.
41. The improvement of any one of claims 28 to 40, wherein the first delivery means comprises a rigid tube.
42. The improvement of any one of claims 28 to 41, wherein the first delivery means comprises an air tube system.
43. The improvement of any one of claims 28 to 42, wherein the second delivery means comprises a flexible tube.
44. The improvement of claim 43, wherein the flexible tube is reinforced by a metal wire wound helically around the tube.
45. The improvement of any one of claims 28 to 44, wherein the second delivery means is permanently affixed or annexed to the first delivery means or to the intermediate location.
46. The improvement of any one of claims 28 to 44, wherein the second delivery means is detachably affixed or annexed to the first delivery means or to the intermediate location.

47. The improvement of any one of claims 28 to 46, wherein the second delivery means is stored inside the first delivery means and adapted to be partially pulled out for use.
48. The improvement of claim 47, wherein part of the second delivery means remains within the first delivery means after the second delivery means is partially pulled out for use and provides an adequate connection between the first and second delivery means.
49. The improvement of any one of claims 28 to 48, wherein means are provided to isolate the second location from the first and second delivery means when goods are not being drawn through the delivery system.
50. The improvement of claim 49, wherein the isolation means comprise a sliding valve inserted between the second delivery means and the second location.
51. A method of transferring goods from a first location to a second location, the method comprising the steps of drawing the goods from the first location to an intermediate location via a first delivery means and drawing the goods from the intermediate location to the second location via second delivery means.
52. The method of claim 51, wherein the drawing of the goods from the first location to the intermediate location and from the intermediate location to the second location is effected by creation of sufficient partial vacuum within the first and second delivery means to transfer the goods.
53. A delivery system substantially as hereinbefore described with reference to figures 1 and 2 of the accompanying drawings.
54. A docking system substantially as herein described with reference to figure 1 of the accompanying drawings.
55. In a delivery system for transferring goods from a first location to second

location, the improvement substantially as herein described with reference to figures 1 and 2 of the accompanying drawings.

56. A method of transferring goods substantially as herein described with reference to figures 1 and 2 of the accompanying drawings.

5

Dated this 21st day of July, 1998

NSL Investments Pty Limited

By its Patent Attorneys

Chrysiliou Moore Martin

78397/98

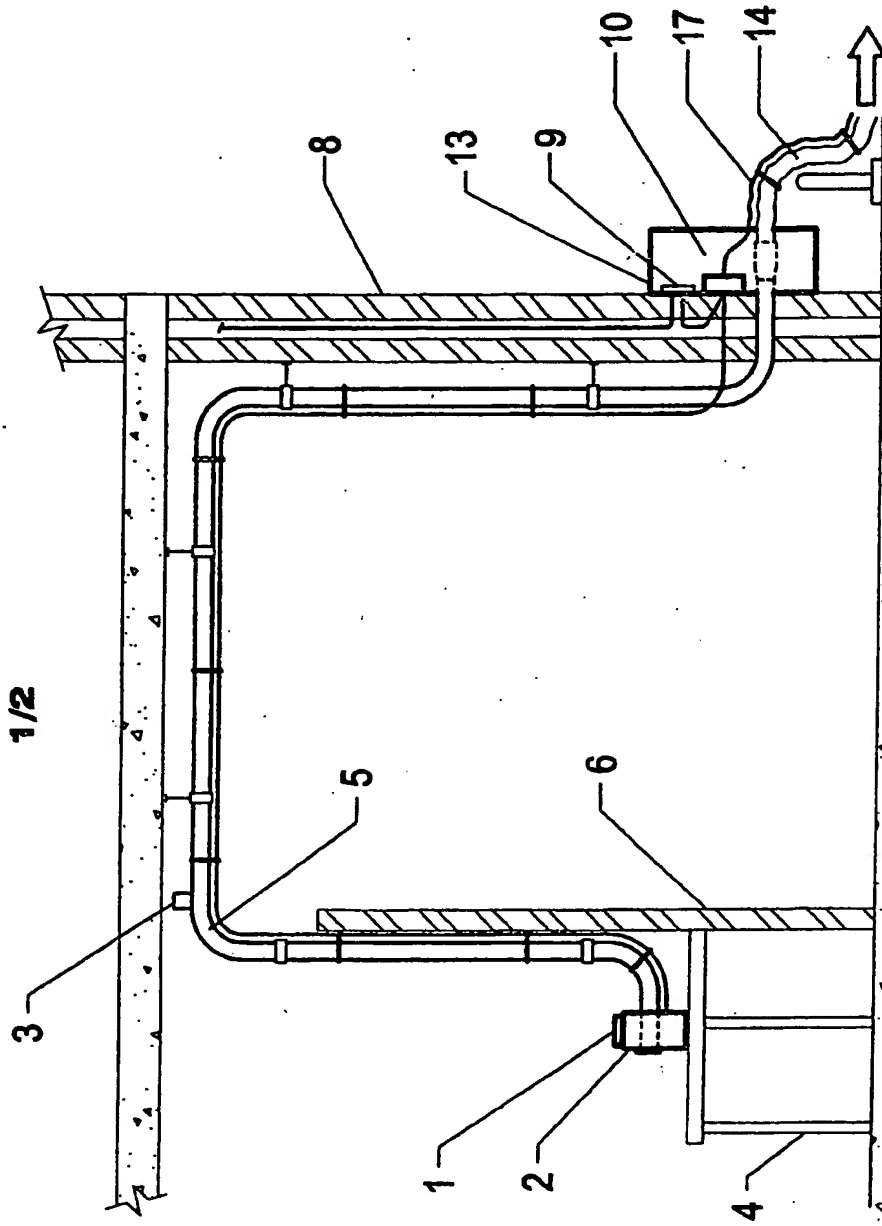


FIGURE 1

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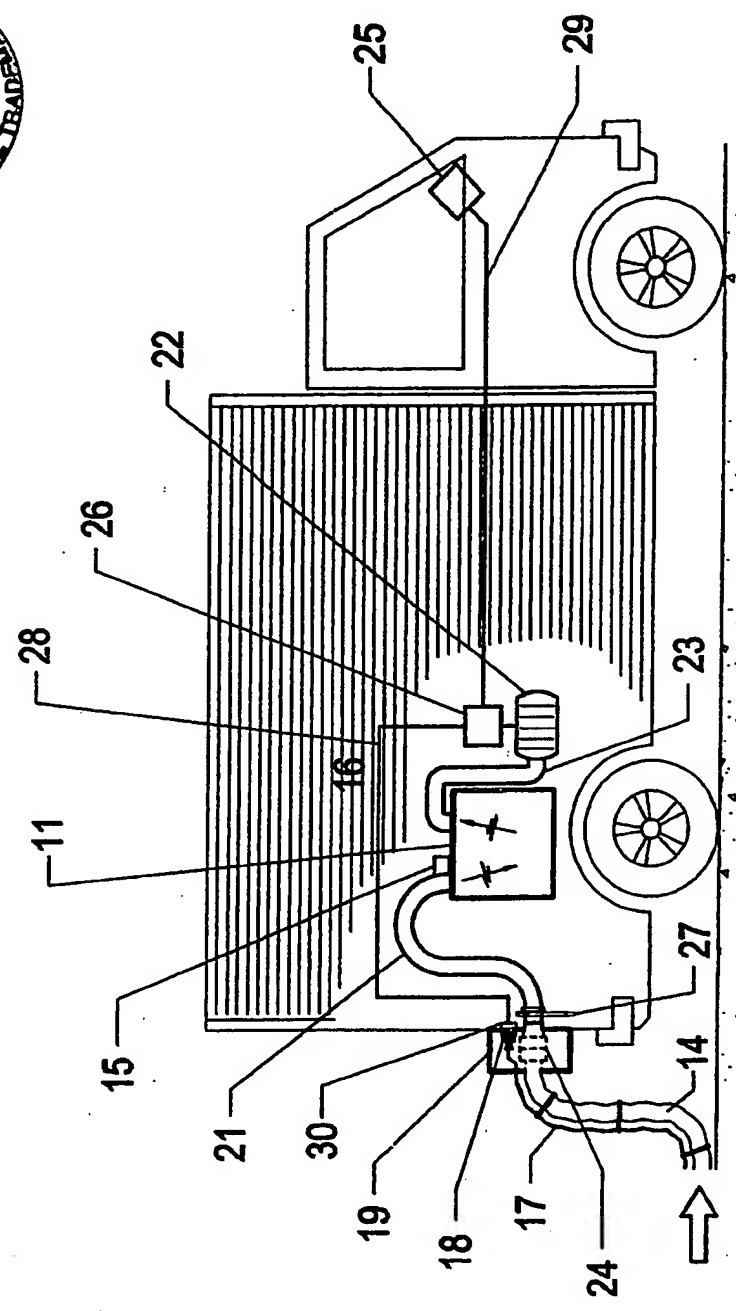


FIGURE 2

10001 05 10 43

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